

Exploring Products and Services in Cyberspace: Towards a Categorization

Joe Peppard

Cranfield School of Management, Cranfield, Bedford MK43 0AL

United Kingdom

Phone: +44 1234 751122

j.peppard@cranfield.ac.uk

Anna Rylander

Royal Institute of Technology, KTH Syd, Design & Health

Marinens väg 30,136 40 Haninge, Sweden

Phone: +46 8 790 48 29

anna.rylander@syd.kth.se

Abstract

In the physical world, products and services are traditionally distinguished from each other on the basis of tangibility and intangibility; indeed, services are often described as intangible products. This distinction has governed the design and management of both. In the virtual world of the fixed and mobile Internet, however, this distinction is no longer appropriate: both products and services become intangible. This is essentially due to the fact that the Internet is not merely a technology but represents an entirely new medium for conducting business, a fact that has been overlooked by many of the early entrants into this space. This medium is defined by information and fundamentally different from the physical space where business has traditionally been conducted. Consequently, products and services require a different conceptualisation. In this paper we focus on business-to-consumer (B2C) markets and explore consumer products and services in cyberspace.

Keywords

Internet, online strategy, information products, digitally mediated services

1. Introduction

The commercialisation of the Internet has seen it been deployed for corporate communications, for facilitating trading activities, for delivering digital content, for the provision of a wide range of services, and as a platform for collaboration. While many organisations have migrated products and services from the physical world to the virtual world, or created new and innovative offerings to take advantage of the capabilities of the technology, the lessons from these early forays indicate that it is not an electronic replication of the physical world (Butler & Peppard 1998, Evans & Wurster 2000). The Internet is more than merely a technology but represents an entirely new medium for conducting business. Not only does it have different attributes than the physical world but within this virtual space much of what we take for granted in our day-to-day activities and decision-making processes are absent. In B2C (business-to-consumer) markets, the focus of this paper, consumer behaviour is also different (Butler & Peppard 1998).

In the physical world, products and services are generally distinguished from each other on the basis of tangibility and intangibility – products are portrayed as tangible while services

are seen as being intangible. Services are often described as “intangible products” (Heizer & Render 1999, p. 13) and are generally not precisely defined, but defined based on what they *are not* rather than what they *are* (c.f. Schmenner 1995). A recent review identified differences that related to measurements used to assess effectiveness and efficiency, differences in production strategies and differences in production process between organisations producing tangible goods and intangible services in the physical world (Bowen & Ford 2002). While many products today have a service component, or provisioning of a service has a physical aspect, with the advent of the Internet, both products and services become intangible. Couple this with the Internet as a medium and one is faced with an entirely new environment and set of circumstances for conducting business. If companies are going to be successful with their online strategies our analysis would suggest that it is crucial for them to understand the characteristics of goods and services in the virtual world as well as the behaviour of consumers when they move online. The objective of this paper is to explore products and services in cyberspace in order to develop a categorisation that is more appropriate to the medium in guiding management action.

The paper first investigates the Internet as media and draws out some implications for consumer behaviour. It then examines some of the fundamental attributes of information products and digitally mediated services. The properties of information are then explored, with a categorisation of the different types of digital content developed and comparisons made across a number of dimensions. The paper concludes with a number of implications.

2. The Internet as Media

In “going on the net”, most companies view their online strategy as a technology play. Indeed, many of the early predictions of the impact of the Internet on business are based on this assumption and have failed to pass. For example Kalakota and Whinston (1996) predicted that brands would die – this has not been the experience. The belief that middlemen would disappear has again proved false – in fact a new breed of ‘*middlemen*’ (Hagel & Singer 1999). Evidence also suggests that being ‘first’ is not the key to success as suggested by Downes and Mui (1999). However, the claim that the Internet represents a new nearly ‘frictionless market’ has some empirical support (Brynjolfsson & Smith 2000) but this prediction is premised on the ability of technology to cut transaction costs, an objective of IT investment since computers first entered organisations. What organisations have failed to consider in developing online strategies is that the Internet is an entirely new medium for conducting business and must be considered as such.

This medium is an information-defined space. Apart for having no physical manifestation, its shape, look, topology and context are all defined by information. It also exhibits a number of distinct features that differentiate it from physical space. Issues of geography and location are no longer important (Butler 2003). It provides individuals and organisations with the capability to control the production, storage and dissemination of information (Havick 2000). The constraints of space, all too present in the physical world, cease to be relevant. It is perhaps the absence of physical and tangible artefacts in this information-defined space that have the most serious implications for consumer behaviour. Yet these artefacts provides the clues that are crucial for humans in their decision-making processes, and their absence has implications for trust, for building brands, and for establishing customer relationships, etc.

For example, one of the principal reasons that many pure-play Internet banks failed was due to the lack of trust that existed between the online venture and customers. Confidentiality and security are components of trust (Dayal *et al.* 2000, Kim & Prabhakar 2000). In the

physical world of banking, physical cues like large imposing branches and knowledge of the person managing your account all contribute to the creation of trust. On the Internet such cues are absent, which has resulted in people being reluctant to deposit their money with such virtual institutions. Contrast this with the relative success of on-line brokerages, where an “intelligent” customer base, trading process, and the dematerialization of the product over many years, made them more suited to new pure-play start-ups. Researchers in consumer behaviour have found that consumers recognise differences in size and reputations among Internet stores and that these influence their assessment of the store trustworthiness, their perception of risk, and their willingness to shop with a particular store. A customer who believes that there is a physical store behind a website is more likely to trust the site on first encounter (Jarvenpaa & Grazioli 2000).

Physical spaces form important constituent parts of what we might call “settings”, to which a set of social norms that tells us how to behave are attached. For example, when a person enters a library (or an office, a theatre, a church...) he has never been in before, he generally recognises it as a library and behaves and interacts with other people accordingly (Lawson 2001). Such norms of behaviour are currently absent in the virtual world. On the flip side, the technology cannot interpret many of the clues, both verbal and non-verbal, given off by a human, as might occur in the physical world. Consider, for example, the reaction of a customer when he sees an unexpectedly high price for a piece of furniture. In the physical world the salesperson can adjust his approach, make another suggestion or offer a “better

Nevertheless, people's interactions with computers, television, and new media are *fundamentally social and natural*, i.e. we expect media to obey a wide range of social and natural rules. These rules are derived from the physical world of interpersonal interaction. Reeves and Nass (1996) have conducted research on social responses to communication technologies for over 10 years and coined the term “the media equation”, meaning *media equals real life*, to illustrate this relationship. The media equation is counterintuitive; we may know intellectually that computers do not have feelings, that a computer programme is neither friendly nor hostile, does not have a gender, that a ball thrown at us on a screen will not hit us and so forth, nevertheless, we treat them as if they do. According to the media equation all humans automatically and unconsciously respond socially and naturally to media. The implications for developers of online products and services are numerous. For example, the same rules of politeness apply for web solutions as in real life, something often overseen by web-site developers. Furthermore, people will assign a personality to characters on a web site or possibly an entire solution, based a number of simple rules that we use in everyday life. Words and pictures in media are *symbolic representations* of “things” such as images, ideas and facts that are not actually present. When this information is mediated we often assume that people only think about *who* sent the information and *why*, and what it *means*. However, research shows that this view can assume too much – when a picture threatens, we don't think about who created it, what they intended and what it all means; we often think only about what we should *do* (Reeves & Nass 1996).

Put simply, humans have not evolved to accommodate twentieth century technology. The human brain evolved in a world in which *only* humans exhibited rich social behaviour, and a world in which all perceived objects were physical objects – anything that seemed to be a ‘real’ person or place was ‘real’.

The media equation is particularly relevant for information mediated via the Internet as it is an interactive space permitting two-way communication, something that was not possible with older technologies such as electronic data interchange (EDI). This creates an

environment of immediacy and presence – just consider the impact of instant messaging (IM). The Internet defines a new communications environment, what Castells (2001) refers to as “the Internet Galaxy” viewing it as a communications medium with its own logic and its own language. Profoundly, he notes that with the Internet, communication is usually embedded in social practice, “not isolated in some kind of imaginary world.” And because communication is the essence of human activity, all domains of social life are being modified by the pervasive uses of the internet. Turkle (1997) notes that in the age of the Internet computers do not just do things for us, they do things to us, including to our ways of thinking about ourselves and other people. People explicitly turn to computers for experiences they hope will change their ways of thinking or will affect their social and emotional lives in a nascent culture of simulation spurred by the Internet. In this culture where the boundaries between the real and the virtual are blurring, people take on multiple identities on the Internet when interacting with other people they have never met. As human beings become increasingly intertwined with the technology and with each other via the technology, old distinctions between what is specifically human and specifically technological become more complex. Are we living life *on* the screen or *in* the screen, Turkle asks.

No information, however, comes without context, but writers and designers have always faced the challenge of what to leave to context and what to information. When there are problems with information, the solution offered is usually to add more (Seely Brown & Duguid 2000). Yet, the history of documents points in the other direction, towards less information and more context. The ‘space’ can therefore be as rich or as lean depending on the information that defines it. Compare a web-site that just displays company information with one that in addition to company information, contains product information, permits online ordering, perhaps even facilitates co-creation of the product, enables tracking of orders, and provides online support.

Seely Brown and Duguid (2000, pps. 186-187) note that in the physical world, the word ‘media’ (like the word ‘press’) conveniently spans technology and social institutions. Both are involved in the process of making news. By contrast, in the digital world, media has been reserved almost exclusively for technology and institutional processes are much harder to detect, perhaps a reason why technology concerns generally overwhelm commercial realities in developing online strategies.

3. The Concept of Products and Services in Cyberspace

Products and services made available using the Internet will be defined and shaped by information. This information can be existing information (e.g. pricing or availability) or new information, whether created within the organisation itself (e.g. richer descriptions of products) or imported from an external source (e.g. complementary information that can be integrated with internal information to create a new offering). Information can thus be considered as a corporate asset, although the call for organisations to treat information as an asset goes back many decades (c.f. Cole, 1984; McFarlan, 1984; Porter & Miller, 1985). However, the nature of information that requires managing has changed in the last several years from primarily numbers and text to now include images, pictures, graphics and multimedia. This shift from a ‘lean’ to ‘rich’ content, particularly in the context of products and services in cyberspace, presents new challenges for the traditional role of information management.

Information products are products that may currently exist in a physical form, but can be digitised and distributed electronically. Included are text, images, sounds, video, software,

etc. Such products are essentially knowledge that has been made explicit and information that has been formalised, for example, books, newspapers, music, a baseball score, stock prices or a web site. They may also represent the intellectual endeavours of the staff of an organisation, such as research where new knowledge, created within an organisation, is made explicit and offered for sale. Information products can also be information assets that have been *packaged* to appeal to a certain audience or market.

Apart from innovative services (see below), some traditional services are also mediated by the new medium – what we refer to as digitally mediated services. This continues the evolution that has been occurring in service industries as organizations attempt to automate aspects of the service delivery process to reduce cost and increase quality and consistency of the service as well as improve both convenience and availability of the service (Quinn *et al.* 1990). Many online services are information-mediated versions of services that exist off-line. Amazon.com provides a book purchasing service. Expedia.com is an online travel agent. Tesco.com is an online grocer. However, books purchased on Amazon.com or Barnesandnoble.com are delivered to the customer by courier or post (although e-books can be delivered electronically). These sites provide the mechanisms to bring together buyers and sellers and then transact business; it is this process that is mediated by an information-defined environment. Online banks provide customers with services on-line that allows them, among other things, to undertake transactions and check balances via the Internet.

The Internet also supports innovative service designs. For example, Salesforce.com delivers sales force automation (SFA) functionality over the Net. For a monthly fee, small and medium sized firms in particular, can avail of functionality that would probably be prohibitively expensive for them using tradition delivery mechanisms. Person-to-person auctions such as eBay.com, or spread-betting operations like Betaq.com, are not commercially viable in the physical world. PTV.ie is a personalised TV portal site targeted at UK and Irish markets, offering full listings without requiring user registration and has themed guides which users can browse. Alternatively, personalised guides can be retrieved after registering and delivered to multiple devices. In the personalised guide one can pick preferred viewing times, genre, programmes and channels. PTV also learns about your viewing preference over time, and using this information it automatically constructs a TV guide to match your tastes. Location-based services look set to be a key offering for mobile devices. In Tokyo, for example, J-Phone's J-Navi service lets users enter a phone number, address or landmark, and then searches the area within 500 meters. This makes it possible to find the subway station nearest to a particular shop, or a particular kind of restaurant within walking distance of a particular office building; a map to these locations can also be provided.

Both digital information products and digitally mediated services have increased in importance over the last few years and are set to increase even more into the future. However, there is a gap in the theory addressing the development, management and marketing of such products and services. Information products are neither pure products, nor pure services in the strict meaning of the terms. They constitute a category of their own as they have a different set of characteristics and therefore need to be managed accordingly. In addition, appropriating value from digital information products and digitally mediated services demands different strategies than in the physical world.

4. Digital Information Products and Information-Mediated Services

In cyberspace, products and services are defined and shaped by information; for products, information can be the product that is offered for sale. Information is unlike other assets that an organisation has at its disposal. Its properties are different, it behaves differently from physical assets and it does not conform to the economic principles upon which the accounting framework is based. Consequently, accounting rules and regulations are inadequate in dealing with information assets. For example, information is considered too volatile and its value too difficult to determine for it to be recognised as an asset in accounting terms and it therefore only appears in financial statements if it is acquired, and even then it is merely shown as a cost. Yet, today, an increasing percentage of the value of a company is represented by intangible assets, either information itself or other assets that are underpinned by information (Stewart 1998, Sveiby 1997, Edvinsson & Malone 1997).

A fundamental difference between information and traditional, tangible assets is that information is non-linear with respect to the economic returns it produces (Boisot 1999). For example, there is no one-to-one relationship between the effort required to create an information product and the value it produces – thus contradicting one of the fundamental principles underpinning the accounting system. This relationship between input and output is complex and is often seen as unpredictable. Through identifying the mechanisms that affect this relationship, the possibilities of controlling the relationship are improved and thus disasters can be avoided and more opportunities are opened up for exploiting the full potential of information assets. Before we get into the specifics of products and services in cyberspace, we would like to mention a few fundamental dimensions of how information behaves in the creation of value in the virtual world, as this provides the basis for online products and services.

4.1 The Characteristics of Information

The value of information is context specific. Information can have a different value for different people, and this can differ depending on the time and situation of use, as well as the knowledge of the recipient. Quality is usually more important than quantity when it comes to information – but ‘what quality is’ varies according to context. The following variables are particularly important for determining the value of information:

- *Specificity of time.* Information can have a time dimension to it, either in its acquisition or it must be used within a certain time frame to be of value. For example, information about a customer’s first impression of a product or the magnitude of an earthquake have to be captured when they occur or the opportunity to register the information will be lost forever. This information is thus time specific *in acquisition*. Information that loses its value if it is not used directly after it is available is time specific *in use* (Sampler, 1998). The classic example of this is information influencing share prices. But it is also relevant for other types of information that companies use such as sales statistics for seasonal or fashion sensitive goods.
- *Specificity of knowledge.* Information can require a certain degree of knowledge from the person that is to acquire and/or put the information to some use. For example, many market research organisations employ students to collect survey information. They are equipped with questionnaires and prompts and given some basic training. A certain level of knowledge is therefore required *to acquire* this information. However, additional

knowledge is generally required in order *to use* this information (Sampler, 1998). To analyse and interpret this survey information, knowledge only possessed by statisticians and sociologists is required. Similarly, many help desks are staffed by employees who answer customer calls and record information about faults reported – scripts are often used to guide them through the questions to ask customers who phone in. Engineering knowledge, however, is usually required to assess this information and determine possible solutions as well as ensure that these problems are recognised and corrected in later versions of the product. It is therefore not necessary for the person with the knowledge to acquire certain information to also have the knowledge to use it.

- *Situation of use.* The situation of the user when the information is perceived, processed and assimilated significantly affects the understanding and appreciation of the information product. The environment within which information is used has significant importance for the value of information to the user. This includes everything from the user's state of mind when the information is received to the physical environment and the medium used to access or display the information. The objectives and values of the user are also very important components. Returning to the example of share prices for trading, which is highly time specific information, this does not necessarily mean that the information lacks of value when it is "old". In another situation, or for another user with different objectives, 10-year-old information could be of greater value than information from today, for example a researcher studying long-term stock price trends.
- *Requirement for complementary assets.* Complementary assets can sometimes be a critical requirement to release the value of certain information assets. This includes everything from other information assets to physical assets (e.g. an MP3 player and software is required to play MP3 files or an Adobe Acrobat Reader is required to read Acrobat files). Simply combining one type of information with another can also increase the value of both. For example, information about market and industry trends and specific information about a company are often crucial complements to share prices in order to make investment decisions.

Depending on the extent to which a certain information asset can be valuable outside of it's original context, information assets can have high or low applicability. Information that is highly specific in time and knowledge, that demand complementary assets to be used, and where the value of use is limited to specific situations, has *low applicability*. This type of information normally has an obvious area of use and is difficult to migrate to another. This often means that the information is limited to a certain group of users in certain situations, but in this situation the information can have a very high value; for example a local maritime weather forecast or certain financial news. Information, with *high applicability* has many potential users and uses and can easily be combined with other types of information that opens up new opportunities to create value. This type of information has *high potential leverage*, for example, customer information.

4.2 Information Products, Digital Information Products and Digitally Mediated Services

Table 1 compares products and services in the physical and virtual worlds across a number of dimensions. Grönroos (1990) has summarised the most commonly mentioned characteristics of services and physical products found in the literature and we have used these in our analysis. We have added two additional categories of information products to the table to illustrate the differences between *traditional* and *digital* information products. By traditional

information products we include those with a physical manifestation, for example books, CDs or research reports available in the form of a physical document. With digital information products, content has been digitised and thus can be sold and distributed on-line. Examples are electronic books, music in the form of MP3 files, news, games, or the research reports sold on-line by companies like Gartner or Datamonitor.

Note, however, that today there are few “pure” products or services as companies selling products often try to enhance the value of their products by offering add-on services, and companies selling service often try to “productify” their services to make the value to the customer more concrete. This trend is illustrated by the rise of “solutions” as an attempt to profile a complex mix of physical product(s), services and information products. A similar situation exists for traditional and digital information products – the same content can be found in both physical and digital form, and the borders can be fluid. Many physical products today often include an information product as a “wrap around” to enhance the solution to customers. For example, Slendertone, with its FLEX MAX toning product that exercises the muscles of the abdomen, offers a mentor service – an on-line personalised motivational and advice programme designed to help users of their products achieve diet and fitness goals (www.slendertone.com). The purpose of Table 1, however, is to illustrate the differences between the different categories.

Attributes	Physical products	Services provided in physical world	Traditional information products	Digital information products	Digitally mediated services
Level of abstraction	Concrete	Abstract	Concrete	Both a concrete and abstract dimension. Not relevant to value delivered to customer.	Abstract, but with a concrete dimension because of representation in medium
Level of heterogeneity	Homogenous (all products the same)	Heterogeneous (all services unique)	Homogenous	Depends on the level of interactivity and personalisation	Can be both, depending on level of interactivity and sophistication
Complexity of value chain	Production and distribution separated from consumption	Production, distribution and consumption are parallel processes	Production and distribution separated from consumption	Combination. A digital information product is to some extent separated from production, but the final output will sometimes be co-created with the consumer (in the case of interactive products). Distribution can be either separate or simultaneous with consumption	Production is at least partly separate from consumption – and can be entirely separate (depending on level of interactivity). Distribution and consumption are parallel processes.
Object or process	An object	An activity or process	An object	Combination. Can be an object, but predominantly a process	An activity or process.
Point of value creation	Real value* is created during production	Real value is created in the interaction between buyer and seller	Real value is created during production	Real value is created partly during production, partly on consumption (experience) – i.e. in the interaction	Real value is created partly during production, partly on consumption (experience) – i.e. in the interaction

				between the product and the consumer	between the service and the consumer
--	--	--	--	--------------------------------------	--------------------------------------

*We have used Grönroos' framework as a point of departure for this table, therefore we also use his vocabulary. Please note that what he refers to as "real value" is the point when value can be realised through sales – i.e. value is expressed from the sellers perspective. One can also argue that real value is only created when the product or service is consumed – i.e. value is

Table 1. Differences between physical and digital products, services and information products.

Attributes	Physical products	Services provided in physical world	Traditional information products	Digital information products	Digitally mediated services
Role of customer in production	Customer does not (normally) take part in production. [If a product is customised it is more of a service]	Customer is part of production process	Customer does not (normally) take part in production	Customer may or may not be part of the production process, depending on the level of interactivity	Customer may or may not be part of the production process, depending on the level of interactivity
Ability to store	Can be stored	Cannot be stored	Can be stored	The "base" product (e.g. software) can be stored, but not the "end" product (experience), particularly if interactive.	Service capability can be stored, although not the end service if co-created by the customer.
Ownership	Transfer of ownership on purchase	No transfer of ownership	Complex issue. Ownership of object is transferred, but not necessarily of content, depending on intellectual property arrangements. Generally ownership of content is <i>expanded</i> rather than <i>transferred</i> (see body of paper)	Complex issue (depends on intellectual property arrangements). Generally ownership of content is <i>expanded</i> rather than <i>transferred</i> (see body of paper)	No transfer of ownership of service but certain "rights" may be conferred

Table 1 continued. Differences between physical and digital products, services and information products.

This table illustrates the major shift that IT, and particularly the Internet, means for the development, management and commercialisation of digital information products and digitally mediated services. Using the dimensions of this table, traditional information products have much in common with physical products as they are constrained by their physical manifestation, whereas the characteristics of digital information products are different. In fact, in many respects – and in particular if they are interactive – digital information products have more in common with services than with traditional (physical) information products. Their interactive capability, together with the elimination of the costs and problems associated with physical distribution and the impact of network externalities, open up a multitude of new opportunities for organisations to exploit information through new digital offerings. On the other hand, digitally mediated services have several features in common with traditional products, not present with traditional services available in the physical world. The face-to-face interaction so often critical for services in the physical world is not possible for digitally mediated services. However, service capability can be stored and better controlled, thus promising more consistent quality of services and removing the constraints of time and place. This analysis illustrates why the practice of simply moving traditional information products to the Internet will so often fail – physical information products and digital information products have fundamentally different characteristics. In fact, producers of digital information products have more to learn from providers of traditional services than from providers of traditional information products.

Worth highlighting is that many on-line services are generally more demanding of the customer than their physical world counterpart. While the customer can be more or less passive in the physical world, he is now required to become more involved in the provision of the service. The service is thus co-created and this has implications for customer value. As some services move online, significant assumptions are made about the customer, including their knowledge-base. Consider the purchasing of airline tickets. If a customer uses a travel agency in the physical world to purchase a seat, the agent will usually ensure that she understands the travel requirements of the customer and combines that knowledge with her knowledge of airline travel. For example, that a return ticket is cheaper than a single ticket or that a Saturday night stay usually reduces the cost of a ticket. Some travel agents will also book “back-to-back tickets” for midweek travel, which can reduce the cost of tickets – many travellers are unaware of this. Travel websites will usually permit a customer to book single tickets to and from a particular destination; in the physical world, the agent would point out that it is cheaper to buy a return ticket.

Information products, like services in the physical world, are also *experience goods* (Peterson *et al.* 1997), that is, the customer has to experience the product in order to value it. How do you know the value of the newspaper until you have read it? Or whether you like a piece of music until you have listened to it? Or the usefulness of report until you have read it? Therefore consumer choice decisions are influenced by emotional expectations rather than cognitive product attributes. Informational inputs such as critics reviews, word-of-mouth and advertising, as well as latent product interest, are also important determinants of consumer choice (Neelamegham & Jain 1999). The lack of tangible cues for the customer to assess the quality of the information product of course poses particular problems for their marketing – especially given the emphasis of quality over quantity. A way around this problem is to distribute samples or previews of parts of the information product for free. Building a brand and reputation, which provide some sort of guarantee that the content will have a certain quality or profile, also becomes a critical activity. For example, Gartner Group conduct research in the IT industry and make it available to their membership, who pay a subscription to have access to their analysis and reports. Prospects can browse their website to get samples of the information products they sell. Gartner has established a strong brand that sees chief information officers (CIOs) from many of the world’s largest corporations look to it for advice and trends in the technology area. Digitally mediated services are less experience goods – once you avail of the service subsequent ‘experiences’ will be similar.

Digital information products and digitally mediated services are *non-rivalous*, in an economic sense. That is, one person’s consumption does not diminish the amount available to others. Reading a report, for example, does not mean that the information it contains is now not available to others. In fact, any number of people can read the same report at the same time. And, unlike traditional physical assets, it does not depreciate through usage. This is why the issue of transfer of ownership becomes complex. The seller of an information product still retains the valuable information, no matter how many people it is sold to. However, by becoming widely available its value may reduce; scarcity often means that a higher price can be extracted for particular information. On the other hand, the opposite situation may also hold true, it is only when an information product has become widely known (e.g. a book or a movie), or there is a sufficient number of other compatible information products available on the market that the information product reaches a critical mass and thus has a greater value to the users (e.g. Napster or MS windows). This is the *network effect*, and it can be particularly powerful for digital information products because of their ease of distribution (Arthur, 1999).

Finally, information products have a different *cost structure* than physical products. Traditional financial models – and thus “conditioned” economic thinking – are built upon

cost. The initial cost of creating the first copy of an information product can be very high, but the marginal cost is generally very low, with perfect fidelity (no quality loss). This is particularly relevant for digital products, where reproduction costs are next to nothing as are distribution cost.¹ Nor are there any capacity limitations for production and distribution. This means of course that traditional economic pricing models, calculated by using fixed cost divided by number of products plus marginal cost, are inapplicable. When the initial cost for a certain number of producers (e.g. the yellow pages on a CD) is sunk, the competitive forces tend to force price towards the marginal cost – which in the case of digital information products is close to zero (Shapiro & Varian 1999). The implication is that it is very difficult to make money from undifferentiated information products, a lesson that many pure-play Internet start-ups found to their peril.

5. Conclusion

In this paper we have suggested that in developing an online strategy, organisations must consider the Internet as a medium and evaluate the implications of this business environment for products and services as well as its impact on consumer behaviour. Taking most existing products and services and moving them directly to the Net without this consideration is likely mean than online strategies are suboptimal. Going online is not a technology play. As with any new technology, we are often constrained in our thinking of new applications by the previous technologies that have dominated our society. Over a decade ago, in introducing the concept of reengineering to the world, Hammer (1990) advised against “paving the cow path” with technology – in short, overlaying traditional work processes and practices with technology. He exhorted organisations to seek out innovative opportunities to deploy technologies by redesigning work processes and that this would lead to significant performance improvement. An argument of similar sentiment can be expressed for this medium. We have demonstrated that the nature of products and services changes in virtual environments; it is important that researchers now consider the wider implications for their design, delivery and management.

References

- Arthur, B (1994), *Increasing Returns and Path Dependence in the Economy*, University of Michigan Press, Ann Arbor.
- Boisot, MH (1999), *Knowledge Assets*, Oxford University Press, Oxford.
- Bowen, J & Ford, RC (2002), ‘Managing service organizations: does having a “thing” make *Journal of Management*, vol. 28, no. 3, pp. 447-469.
- Brynjolfsson, E and Smith, MD (2000), ‘Frictionless commerce? A comparison of Internet and conventional retailers, *Management Science*, vol. 46, no. 4, pp. 563-585.
- Butler, P & Peppard, J (1998), ‘Consumer purchasing on the Internet: processes and *European Management Journal*, vol. 16, no. 5, pp. 600-610.
- Butler, P (2003), ‘Internet retailing: dislocation, dislocation, dislocation’, Working Paper, University of Dublin, Trinity College, Dublin.
- Castells, M (2001), *The Internet Galaxy: Reflections on the Internet, Business, and Society*, Oxford University Press, Oxford.
- Cole RE (1985), ‘Target information for competitive performance’, *Harvard Business Review*, May-June, pp. 100-109.

¹ The nature of information products makes them easily to duplicate, increasing the potential for piracy.

- Datal, S, Landesberg, H. & Zeisser, M. (2000), 'Building digital brands', *McKinsey Quarterly*, no. 2, pp. 42-51.
- Downes, L & Mui, C (1999), *Unleashing the Killer App: Digital Strategies for Market Dominance*, Harvard Business School Press, Boston.
- Edvinsson, L & Malone, MS (1997), *Intellectual Capital: Realizing Your Company's True Value by Finding its Hidden Brainpower*, Harper Business, New York.
- Evans, P & Wurster, TS (2000), *Blown to Bits: How the New Economics of Information Transform Strategy*, Harvard Business School Press, Boston.
- Grönroos, C (1990), *Service Management*, ISL Förlag, Göteborg, Sweden.
- Hagel, J & Singer, M (1999), *Net Worth: Shaping Markets When Customers Make the Rules*, Harvard Business School Press, Boston, 1999.
- Hammer, M (1990), 'Re-engineering work: Don't automate, obliterate', *Harvard Business Review*, July-August, pp. 104-112.
- Havick, J (2000), 'The impact of the Internet on a television-based society', *Technology in Society*, vol. 22, pp. 273-287.
- Heizer, J. & Render B (1999), *Operations Management* (Fifth Edition), Prentice-Hall, New Jersey.
- Jarvenpaa, S & Grazioli, S (2000), 'Surfing among the sharks: how to gain trust in Marchand, TH Davenport & T Dickson, *Mastering Information Management*, Pearson, London, pp. 197-201.
- Kalakota, R & Whinston, AB (1996), *Frontiers of Electronic Commerce*, Addison-Wesley, Boston.
- Kim, K & Prabhakar, B (2000), 'Initial trust, perceived risk, and the adoption of Internet banking', in *Proceedings of 21st International Conference on Information Systems*, December 10-13th, Brisbane, Australia, pp. 537-543.
- Lawson, B (2001), *The Language of Space*, Architectural Press, UK.
- McFarlan, FW (1984), 'Information technology changes the way you compete', *Harvard Business Review*, May-June, pp. 98-110.
- Neelamegham, R & Jain, D (1999), 'Consumer choice process for experience goods: an econometric model and analysis', *Journal of Marketing Research*, vol. XXXVI, pp. 373 - 386
- Porter, M & Miller, V (1985), 'How information changes the way you compete', *Harvard Business Review*, July-August, pp. 149-160
- Quinn, JB, Doorley, TL & Paquette, PC (1990), 'Technology in services: rethinking strategic Sloan Management Review, Winter, pp. 79-87.
- Reeves, B & Nass, C (1996), *The Media Equation: How People Treat Computers, Television and New Media Like Real People and Places*, CSLI Publications, Cambridge, USA.
- Sampler, J (1998), 'Redefining industry structure for the information age', *Strategic Management Journal*, vol. 19, pp. 343-355.
- Schmenner, RW (1995), *Service Operations Management*, Prentice-Hall, Englewood Cliffs, New Jersey.
- Seely Brown, J & Duguid, P (2000), *The Social Life of Information*, Harvard Business School Press, Boston, Massachusetts.
- Shapiro, C & Varian, HR (1999), *Information Rules: A Strategic Guide to the Network Economy*, Harvard Business School Press, Boston, MA.
- Stewart, TA (1998), *Intellectual Capital: The New Wealth of Organizations*, Nicholas Brealey Publishing Limited, London.
- Sveiby, K.E. (1997), *The New Organizational Wealth*, Berrett-Koehler, San Francisco.
- Turkle, S (1997), *Life on the Screen: Identity in the Age of the Internet*, Touchstone, New York, NY.